CHARGE NUMBER: 0307

PROJECT TITLE: Cigarette and Tobacco Measurement Methods

PROJECT LEADER: C. L. Irving

PERIOD COVERED: April, 1980

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I.   Moisture Measurement

The dual channel Instrument Interface Controller (IIC), which was received from Engineering Services last month, was used to collect a single channel of data from the microwave oven being built by Engineering Services. No problems were encountered with the unit in this test. In addition, software was written to transform the data into a form suitable for input into available regression routines. Further tests are planned to simulate two channel data input.

Work on the automatic mircowave moisture meter at Steinbrecher Corporation is proceeding on schedule. The X-band sampling head has been assembled and we have supplied the quartz tubes necessary for the unit so that final check-out of the head can begin. The L-band sampling head is currently being assembled. Tobacco samples at three moisture levels were supplied to Dr. Steinbrecher so that final cavity dimensions for the L-band unit can be determined along with the optimum location for the sample in the cavity to achieve maximum system response. The entire moisture meter is now expected to be shipped about the 1st of June, 1980.

The Motorola MA-5 Moisture Analyzer, an improved version of the original Computrac Moisture Analyzer, was evaluated. This unit has an improved balance and can be set to any temperature between 65 and 175°C. The unit was evaluated with ET, DET, RL, and bright tobaccos, with and without the flavors they would have in a Marlboro, and with Marlboro and Merit blends. The tests showed the unit to give moisture readings with approximately the same error as the OV test. The difference between Motorola readings and OV results were found to be a function of tobacco type and oven temperature but not of tobacco moisture. By choosing the operating temperature of the Motorola unit correctly the difference between Motorola and OV results could be reduced to 0.30 ± 0.5 OV units for all tobaccos tested except ET, for which the difference was -0.10 OV units. These results indicate the Motorola unit could be used to predict OV to an accuracy of ± 1.0 OV units at a 95% confidence level. The time required to obtain moisture values from the Motorola unit was 13.6 ± 5.2 minutes. Due to the poor accuracy of the Motorola unit and the length of time required to obtain a reading the unit will be returned to the manufacturer.

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II. Cylinder Volume Testing

Using the math modeling programs and the daily OV monitor data from the Materials Evaluation Facility the variation that can be expected in equilibrated CV results of ET and DET from RH variations (within control limits) was determined. The OV monitor data from September, 1979 through January, 1980 was averaged and the model was used to predict an RH range from the OV range (mean $\pm 2\sigma$) of the monitor. This RH range was used to calculate a CV range of ± 2.9 cc/10g for both ET and DET due to RH variation alone. Knowing the variation of CV values that can be expected from variations in laboratory conditions should help in the evaluation of data of expanded tobaccos.

An experiment, designed by Mr. J. Tindall, was run to determine the effect of operators on CV test results. This test, using uncased bright tobacco, showed the difference between operators to be as high as 1.2 cc/10g. The test also showed an average difference of 1.0 cc/10g between Rooms D-105 and D-112. This difference between rooms was also found to change from day to day. While this experiment does indicate statistically significant differences exist between operators, laboratories, and days, the differences are small and should present no problems in interpreting results from properly designed experiments.

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